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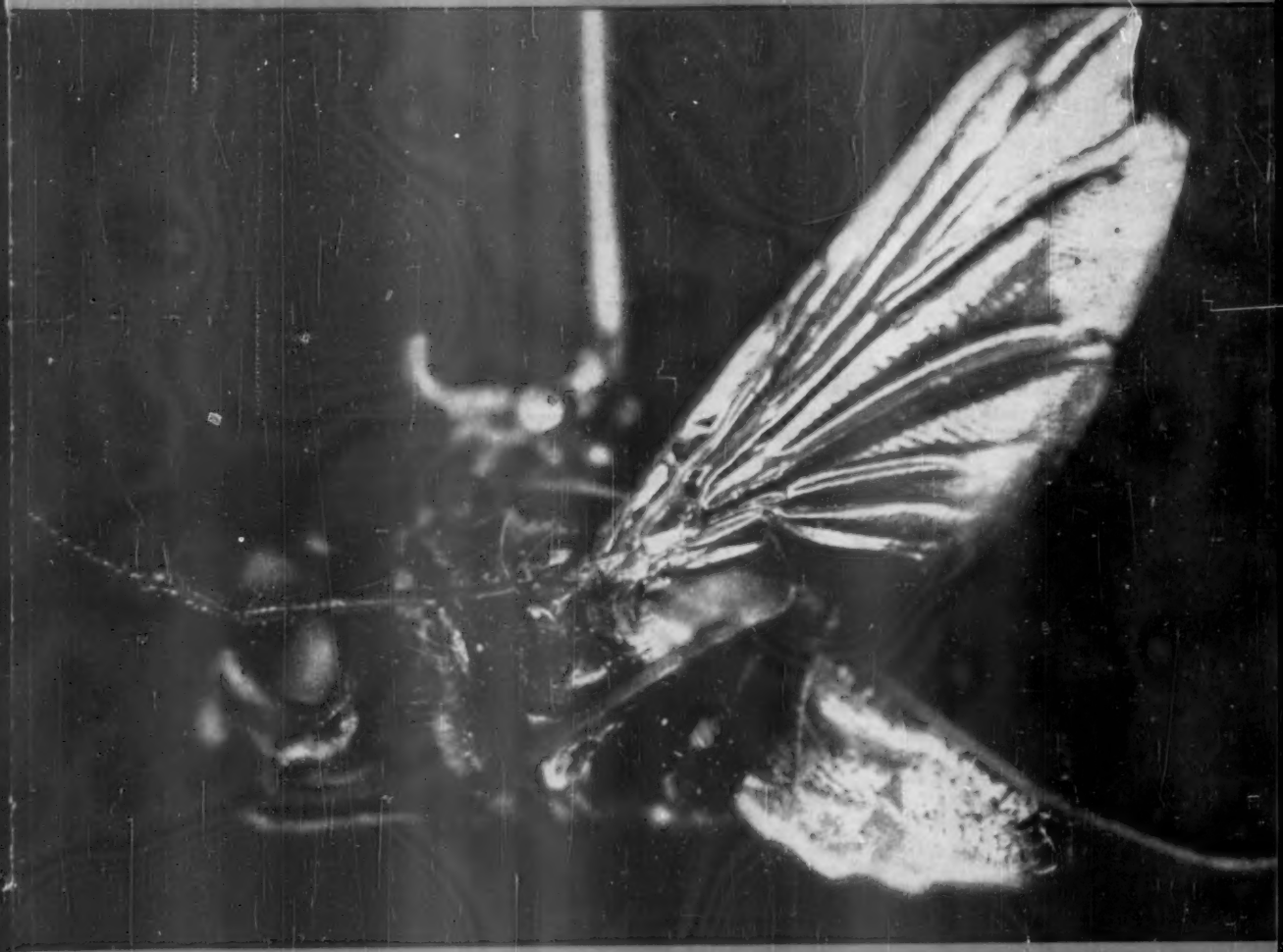
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Flight of Fly

See Page 6

A SCIENCE SERVICE PUBLICATION

What General Electric people are saying . . .

J. W. BELANGER

Mr. Belanger is Vice President, Defense Products Group

. . . The significance of the nuclear-powered submarine is that it brings to reality the world's first working atomic power plant—a forerunner of useful atomic power for merchant ships, airplanes, and the generation of electrical power for industry, farms, homes, and many applications for peaceful living.

By the year 2000, nuclear fuels will be the major sources of energy, regardless of whether fossil fuels are seriously depleted.

Fission (splitting atoms with release of energy) and fusion (combining atoms with release of energy) will both be major sources of nuclear power—fission for controlled power sources, and fusion for explosive-type sources.

By the end of the present century, most of the new large utility plants generating electrical energy for homes and industry will operate with atomic (fission) fuel.

The direct generation of electricity from fission is an open question. Who would dare to deny that even it might be commonplace in 50 years?

Solar fuels must also be taken into consideration in any projection that far ahead.

What will this mean to our way of living? Atomic plants will be safe enough to be located within city limits. Residents of Los Angeles and other low-rainfall coastal areas will probably sprinkle their lawns and wash their clothes in fresh water, distilled from ocean water by heat from atomic fuels.

The rapid development of nuclear energy will have advanced the study of many new materials particularly suited for nuclear energy use, but having many other applications. Neutron spectrometry, radioactive logging of borings, widespread use of tracers in industrial processes, employment of radioactive materials in medicine, biology, agriculture and other diagnostic work—these are but a few of the many avenues which may mean little to the average reader at this time, but which on the other hand do mean a great deal to men of science.

Monogram Magazine

D. L. MILLHAM

Mr. Millham is Vice President and General Manager, Lamp Division

. . . There has been a newly awakened realization among electric utilities and electrical equipment suppliers of the broad undeveloped market in the lighting field—particularly home lighting.

Electrical consumption for residential lighting has tripled in the past 10 years but even so only a very small percentage of homes are lighted properly. We found in a recent survey that at the present rate of improvement, it would take residential lighting 100 years to reach the standards already prevailing in many stores and offices.

More and more people are becoming aware of the advantages of good lighting for schools, offices, streets, industry, autos and even airplanes. They enthusiastically appreciate its contributions to beauty, to comfort and safety, and to eye protection of the whole family.

It is up to us to continue to explore new frontiers of lighting knowledge, and to manufacture better products which translate this knowledge into better living for more people.

at Nela Park, Cleveland

General Electric has recently published a booklet entitled WHY STUDY MATH. Written for high school students, it points out the value of mathematics in everyday life, and the necessity of mathematical training for anyone interested in a career in the expanding fields of science and engineering. If you would like a copy, or would like us to send a copy to someone for you, write General Electric Co., Room 2-111, Schenectady, N. Y.

W. R. G. BAKER

Dr. Baker is Vice President and General Manager, Electronics Division

If I were to have anything to say about programming of an educational television station, I would insist that fully half the effort be expended in finding ways and means of inspiring not only the youths but also the adults to extend, continue or renew their education. Don't misunderstand me. I'm not saying that education itself cannot be inspirational. One of the benefits of educational television is that it enables the outstanding educator, or teacher or instructor to inspire thousands and not just a score, or a few hundred at most.

Many obstacles remain in the path of educational television before it will be proven successful. Besides indifference and active opposition, there will be considerable disagreement as to what should be presented to the public and how it should be presented. But these problems are not insurmountable.

I believe that educational television will succeed in the United States because there is unceasing pressure for greater educational opportunities. There is an awareness and a recognition by almost all persons that through education the ills of mind and spirit, yes, and even of ideologies, can be cured or prevented. So much has been accomplished in a few short years. The strides we have made in science and medicine have been giant strides, but we hear no one echoing the sentiments of the man who decades ago urged that the patent office be abolished, because all possible inventions had been made. We have today an even greater awareness of how much we still have to learn and how great the benefits will be to all people.

at The Chicago Educational Television Association

You can put your confidence in—

GENERAL ELECTRIC

ENDOCRINOLOGY

Sex Gland Stimulating Cells of Pituitary Found

➤ DISCOVERY OF the special cells in the pituitary gland in the head which stimulate the male and femal sex glands to produce their hormones was announced by Drs. Agnes S. Burt and Joseph T. Velardo of Massachusetts General Hospital and Harvard Medical School at the meeting of the American Association for the Advancement of Science in Boston.

These cells are believed to play a part in the striking, if temporary, improvement in some forms of cancer after sex hormone treatment.

The cells are called amphophils. They consist of a protein combined with a carbohydrate and when seen under the microscope, show a few granules, but not as many as two other pituitary gland cells, the basophils and acidophils.

The amphophils were discovered through post mortem examination of pituitary glands from 18 patients. One-half of each gland was used in tests on rats that had had their pituitary glands removed. The other half was studied under the microscope. This give the scientists a way to learn which cells from the body's "master gland," the pituitary, controlled which of the other glands. In six pituitary glands, there was a large amount of sex gland stimulating hormone. In six, there were smaller amounts, and in six there was little or none. The number of amphophil cells in the pituitary glands decreased as the amount of sex gland stimulating hormone decreased. This suggested that the amphophiles are the ones that produce the sex gland stimulating hormone.

A highly significant reduction in amphophils was found in pituitary glands from women with breast cancer who had been given female hormone treatment. This, the scientists pointed out, suggests that part of the good results of female hormone treatment in such cases may come because the female hormones suppress the output of some of the pituitary gland hormones.

Science News Letter, January 2, 1954

ENDOCRINOLOGY

Adrenals Help Adapt To Cold Climate

➤ THE ADRENAL glands, famous for producing anti-arthritis cortisone, apparently help people adapt to life in a cold climate, such as the Arctic.

Using eosinophil cells in the blood as an index, Miss M. Eileen Denison and Dr. M. X. Zarrow of Purdue University, Lafayette, Ind., found that these glands become overactive immediately upon exposure to cold, but as the animal adapts to a cold environment, the adrenals return to a normal rate of activity.

Their studies were carried out under a grant from the Office of Naval Research and reported at the meeting of the American Association for the Advancement of Science.

Science News Letter, January 2, 1954

HOVERING HELICOPTER—Information on an airplane's position, in the form of output signals from the Raydist location system shown at left, are fed into an autopilot located in the helicopter to keep it hovering where desired.

AERONAUTICS

Helicopter Service in Fog

➤ FUTURE INTER-CITY helicopter service, which may permit you to fly through pea-soup fog virtually to the doorstep of your destination, has been brought one step nearer by a new radio device tested at the Patrick Henry Airport, Warwick, Va.

The navigational aid permits the tracking of helicopters with extreme accuracy. It even has landed a helicopter so near two coins hidden near the airport runway that the pilot could scoop them off the ground without climbing out of his seat.

Called Raydist, the Hastings Instrument Company's development is visualized as a possible aid to stratavision—the proposed system of spreading television programs over a larger area by transmitting them from high-flying airplanes. The Radist aid could keep a helicopter pinpointed above a certain spot on the ground.

It is also believed that the device could be used in surveying and mapping work, and in automatic inter-city mail deliveries. It may have military implication also, particularly in rescuing battle casualties from the front lines.

The Radist system uses a set of ground-based radio transmitters not handicapped by line-of-sight conditions. A small transmitter is carried in the helicopter. Instruments compare the radio waves from the ground stations and the helicopter. This yields the position of the aircraft.

When tied in with an autopilot, the device permits the helicopter to be flown completely from the ground and with great accuracy to its destination. The landing point is figured out in terms of its coordinates on a map, then the 'copter directed.

Within the ring of ground-based radio stations, the system is accurate to about five feet. Thus, if the "lay of the land" at the landing site is known, no television camera is needed to show the remote pilot what the craft is settling in.

Science News Letter, January 2, 1954

ANIMAL NUTRITION

Sugar Tests Show Rats Know Calories

➤ RATS KNOW their calories, it seems from experiments by Drs. William J. Griffiths Jr. and T. J. Gallagher of the University of Mississippi.

When given their choice between sugar in water and the equally sweet but calorically useless saccharine in water, they take about as much of one as of the other when at rest. But when forced to swim in a tank until exhausted, they take on the average about 10 times as much of it as they do when at rest, and take a little less of the saccharine solution than when at rest.

Science News Letter, January 2, 1954

PSYCHOLOGY

Pick Future Delinquents

► TESTS THAT show promise of spotting potential juvenile delinquents before they become delinquent are now being developed at the University of California.

Dr. T. R. Sarbin, associate professor of psychology, is working to develop a batttery of special tests to pick out potential delinquents before they reach high school age. If this can be done, such youngsters can be given special attention to prevent them from becoming social problems.

For the past two years the psychologist has been conducting studies of 100 boys between the ages of 14 and 17. About half are normal boys from a city high school; the remainder are psychopathic delinquents from state institutions.

The object is to develop simple tests that show significant differences between normals and delinquents. Then when youngsters give answers characteristic of the abnormal patterns, they may be potential delinquents.

Two tests are already promising. In one, the youngster copies geometrical figures on a piece of paper. When no restriction is placed on the copying, delinquents respond as accurately as normal boys. But when limits are imposed, such as drawing the figures on small pieces of paper, the accuracy of the delinquents breaks down immediately. This indicates the inability of delinquents to tolerate limits on their behavior.

In a second test, youngsters see motion pictures in which other youngsters make decisions about situations they are faced with. When the picture is over, the subject is told that the boy in the picture was given a preference test concerning occupations and recreational interests. The subject is then asked to guess what choices the boy in the movie made. The subject is then told whether he is right or wrong about each guess, and is given additional items in the preference test.

The psychologists find that psychopathic delinquents do not seem to "learn" how to make correct analyses of others, but that normal youngsters make better guesses as they are given more experience.

Collaborators with Dr. Sarbin are Dr. Norman Livson, Bela Baker and D. S. Jones of the University of California, and Prof. Paul Wallin, Stanford sociologist.

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ENTOMOLOGY

Pink Bollworm Spreads

► FRANTIC EFFORTS by cotton-belt states have slowed but not halted the spread of destructive pink bollworms. The U. S. Department of Agriculture's Bureau of Entomology and Plant Quarantine has reported discovery of the insect in Arkansas for the first time.

The bollworm is rated as potentially equal to the billion-dollar boll weevil in destructiveness. In 1952, it did more than $28,000,000 damage in 38 south Texas counties.

Pink bollworm is now largely confined to parts of Texas, Oklahoma, Louisiana and Arizona. Each year, however, its range of destruction is slightly increased.

Unusual weather conditions have contributed to the recent quickened spread in the opinion of experts. These conditions have held back control measures at critical periods of the bollworm's life cycle, allowing a large increase in the bollworm population.

States and counties have drastic quarantine regulations to control the insect. Border patrols this year intercepted several hundred specimens being transported out of infested areas in cotton seeds and plants.

Pink bollworm was first found in Hearn, Tex., in 1917. Since that time its spread has been slow but sure. In addition to spreading by transportation of infected cotton, the adult moths have a small flying range that may be greatly extended if they are caught in strong air currents.

Every known method of suppression, from insecticides to natural parasites, is being used in the fight against the bollworm. Compared to the quick spread of the boll weevil, the bollworm has been held down for many years, but the fight is far from over for hard-pressed cotton growers.

Science News Letter, January 2, 1954

AGRICULTURE

Weed Killer Causes Cotton-Rice War

► WAR BETWEEN rice and cotton growers in the delta area of Mississippi has broken out over the weedkiller, 2,4-D, Dr. Ross E. Hutchins of Mississippi State College reports in *Science* (Dec. 25, 1953).

Rice growers have been using the herbicide to control coffee-weed in their fields. The difficulty is that cotton is "almost fantastically sensitive to 2,4-D and related compounds," Dr. Hutchins says.

Cotton growers now have damage suits totaling several hundred thousand dollars before the courts.

Dr. Hutchins points out that it is not unusual for severe damage to cotton plants to occur four or five miles away from ground applications of 2,4-D, and that this damage is increased by spray applications from airplanes.

The situation has caused cotton states to take elaborate measures to protect cotton growers. In some states purchases of 2,4-D, 2,4,5-T and related hormone-type herbicides must be registered as in the case of narcotic drugs.

Texas requires that a surety bond of $20,000 be posted before permission may be obtained to apply 2,4-D. Other regulations specify minimum distances from susceptible crops.

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MEDICINE

Temporary Leukemic Relief

► ALMOST ALL the children who have acute leukemia, malignant disease of the blood and blood-forming organs, can now be given some kind of remission during which they will for a time be restored to health, Dr. C. P. Rhoads, director of the Sloan-Kettering Institute for Cancer Research, New York, declared.

This is possible through the use of three groups of modern chemicals: antifolic acid chemicals; cortisone and ACTH, famous first as arthritis remedies; and 6-mercaptopurine.

This last, 6-mercaptopurine, has been distributed to more than 200 groups of cancer fighters since last January. It is not a cure but it has brought remissions to about half the patients treated. It helps both children and grown-ups with acute leukemia, and is active in some children who are refractory to antifolic acid chemicals. The remissions have lasted in some patients "for a good many months," but others have relapsed within weeks.

Reports of the patients who have gotten the chemical are now being analyzed, Dr. Rhoads told the American Pharmaceutical Manufacturers' Association meeting in New York.

The drug was developed through a joint research program with Wellcome Research Laboratories, Tuckahoe, N. Y., the Southern Research Institute of Birmingham, Ala., and the Sloan-Kettering Institute.

This new chemical is one of many specifically designed to interfere with utilization by cancer cells of materials needed for manufacture of the nucleic acids vital to cell life. It could be made on this rational and specific basis because scientists have discovered in recent years that the nucleic acid, DNA, of cells is not the same for every cell. They can therefore hope to tailor drugs to interfere with DNA production in each of the eight main death-dealing kinds of cancers: lung, breast, uterus, intestines, prostate, bladder, mouth and the leukemias.

Since 6-mercaptopurine is not a cure for leukemia, scientists are now working to design a more specific anti-leukemic cell chemical. Dr. Rhoads feels sure they will succeed, though when and with what change in the 6-mercaptopurine molecule cannot be predicted at the present time, he said.

But following these principles it will be surprising, he said, if scientists do not find "new and better means for cancer control in man within the foreseeable future."

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MEDICINE

Cancer Theory Overthrown

► A 25-YEAR-OLD cancer theory first proposed by the famous German biochemist and Nobel prize winner, Otto Warburg, has been overthrown by atomic age research reported at the meeting of the American Association for the Advancement of Science in Boston.

The old theory came from Warburg's findings that cancer cells convert sugar to the milk-souring chemical, lactic acid, in much greater amounts than normal cells do. This gave Warburg the idea that cancer cells may have a primitive type of metabolism in which energy is produced by fermentation. Subsequent studies by other workers promoted this theory.

However, the fermentation process is a relatively inefficient energy producer. It yields only three-tenths of a calorie per gram of sugar as compared to six calories per gram when sugar is completely burned to carbon dioxide, or nine calories when fats are burned to carbon dioxide. This would not seem to be enough to supply the energy needed by rapidly growing cancer cells.

In this atomic age, a critical test could be made of the old theory. Fats and sugars could be labelled with radioactive carbon from the U. S. Atomic Energy Commission and fed to cancer cells. This was done in the laboratories of Lankenau Hospital Research Institute, Philadelphia, under the supervision of Dr. Sidney Weinhouse who reported the studies.

The test showed conclusively that cancer cells are able to carry out the complete combustion of sugars and fats to carbon dioxide and that they use the same mechanism as normal cells.

The high lactic acid production of cancer cells compared to normal cells, it is now believed, is due to a difference in amount or distribution within the cancer cell of a potent catalyst known as DPN, short for diphosphopyridine nucleotide.

This substance, which contains as one of its components the vitamin, niacinamide, is present in animal cells in amounts of the order of 50 to 500 millionths of a gram per gram of tissue. It was found that its content in cancer cells is very low as compared with normal tissues.

This work was done by Charles E. Wenner, Ruth H. Millington, Grace Medes, Morris A. Spirtes, Arthur Allen, Alice A. Thomas and Lillian Jedeiken.

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Some water-filled glass vases and globe-like fish bowls can start *fires* in the home by focusing the sun's rays on inflammable materials.

ROBERT ANDREWS MILLIKAN —Pioneer in the physics of atomic particles, Dr. Millikan died Dec. 19.

NECROLOGY

Millikan Last of Original Science Service Trustees

► IN ADDITION to his fundamental researches in physics and his leadership in the organization of research and education, Dr. Robert Andrews Millikan, who died Dec. 19, 1953, at the age of 85, was a pioneer in the effort to inform the public about science.

He was one of the original trustees and incorporators of SCIENCE SERVICE, and he served actively on the board of trustees since its organization in 1921.

A statement issued on behalf of the staff of SCIENCE SERVICE stated:

"Dr. Millikan was one of the world's great scientific immortals. He will also be remembered for his vision and interest in bringing public and science together. One facet of this was his service as a SCIENCE SERVICE trustee since that institution's founding in 1921."

Science News Letter, January 2, 1954

BIOCHEMISTRY

Milk's Protein Has Anti-Goiter Agent

► DISCOVERY THAT a purified form of milk's protein, casein, has a "thyroid-like property of goiter prevention" is announced by Drs. L. Van Middlesworth, A. H. Tuttle and Ann Threlkeld of the University of Tennessee in *Science* (Dec. 18, 1953).

Dr. Middlesworth had previously found that rats on a synthetic low iodine diet containing purified casein did not develop goiter. The new experiments, confirming the presence of a goiter preventive in purified casein, were made with nursing dog mothers injected with radioactive iodine.

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PSYCHIATRY

Hypnosis Aids Memory

► HYPNOSIS HAS helped doctors treat a patient brought to Wayne County General Hospital, Eloise, Mich., suffering from complete loss of memory.

No organic cause, such as brain injury, could be found for the memory loss. Psychologic and psychiatric tests showed that the patient, a man about 30 or 35 years old, was a dependent, suggestible character, laden with anxiety, and with an hysterical type of personality.

Some experience with fire had apparently had a severely injurious effect on him emotionally. He told the doctors, "Every time I see red, I see fire. I can't explain it. If I could explain that, I could explain everything. Truthfully, I wish I could."

Under hypnosis, the patient was able to give his name, age, residence and past history. It turned out that several years ago he had been forced to leave home by a stepfather who was trying to get the property the patient's mother had left to the patient. He finally gave up the unequal struggle with the stepfather and stepbrothers and went away in an attempt to "forget" it all.

The property settlement could not be made without the patient's consent, so the stepfather evidently tried to find the patient at each place he worked and made him more unhappy.

One of these places was a farm where a fire broke out. The patient and a fellow worker tried to get the cattle out of the barn and in the course of this, the fellow worker was burned. The patient felt very guilty about his "buddy's" death.

After his memory was restored, the patient was referred to a position on a farm where he could be constantly supervised and guided, since he apparently needed much reassurance to keep from getting unbalanced more seriously. He has been doing well in this protective atmosphere.

The case is reported by Drs. Sanford M. Izner and Rudolf Leiser and Mr. John Goldman in *Diseases of the Nervous System* (Oct., 1953).

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PALEONTOLOGY

Fill Eohippus History

► GAPS IN the history of eohippus, or dawn horse, prehistoric ancestor of the horse, will be filled by fossil skulls found in Colorado, Dr. George G. Simpson, chairman of the American Museum of Natural History department of geology and paleontology, predicted in New York.

Hailing the fossil find as "one of the most important ever made," Dr. Simpson said the eohippus skulls were included in fossils taken from a deposit in the Huerfano Valley, northwest of Walsenburg, Col. The deposit promises to be the richest single find known of mammals of the Eocene epoch, dating from 50,000,000 to 60,000,000 years ago, he said.

Eohippus was a small animal ranging in size from 10 inches high to about half the size of a Shetland pony. Only a few skulls have been discovered previously and all were imperfect.

Dr. Simpson described the Colorado skulls as "practically perfect." He also indicated that several skeletons, each more complete than the four partial skeletons previously assembled, may be put together.

The bones were so thick in the rock at the site that, to avoid damaging them in the field, many were taken out in a single large block of rock and bones weighing about two tons. This rock has been opened at the Museum, but the process of removing the bones without injury may take several years, Dr. Simpson pointed out.

Knowledge of eohippus has been incomplete in the past due to the scarcity of good fossil material. Dr. Simpson said that paleontologists will now have a basis for comparison on which to make judgments about range of variation in the dawn horse.

Dr. Simpson said that full identification would be delayed, but "we already know that at least eight different kinds of early mammals are represented in the quarry."

The site of the excavation was originally discovered in the summer of 1952. During the past summer, workers returned for more excavation. Numerous fossils remain and more field work is planned.

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HORTICULTURE

Rules May Ease Soil Conditioner Confusion

► GETTING THE right soil conditioner for your lawn, garden or, if you are a farmer, for your pastures and crops should be easier in the future.

Misrepresentation in the advertising and selling of these materials, which has led to confusion and disappointment for gardeners and farmers, will be ended, it is hoped, by rules to be promulgated by the Federal Trade Commission.

Discussions have now started on a preliminary set of rules presented to industry representatives for their consideration by David R. Stauffer, attorney in the division of trade practice conferences of the Commission.

Soil conditioners are a recent agricultural development. They improve the physical properties, or tilth, of the soil, which makes it easier to cultivate.

At the Washington conference, industry representatives disagreed as to how the term soil conditioner should be used. Some wanted it to refer only to synthetic organic chemicals; some wanted a broader definition to include chemically modified natural materials; and one group wanted the rules to apply to all soil conditioners including peat, humus, gypsum and other natural products.

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PHYSICS

Electricity Flows Freely In A-Bomb Debris Metal

► A METAL that is contained in the debris of atomic bombs has been discovered to be unusually superconductive.

Element 43 in the periodic table, technetium has been proved in experiments to be one of the metals that allow electricity to flow through it almost without hindrance when the temperature is close to absolute zero.

Dr. J. G. Daunt of Ohio State University and Dr. J. W. Cobble, formerly at Oak Ridge National Laboratory and now at the University of California's Radiation Laboratory, did the experiments that showed that this metal becomes superconductive at the relatively high temperature of 11.2 degrees on the absolute scale. Their results are reported in the *Physical Review* (Oct. 15, 1953).

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ENTOMOLOGY

High-Speed Photograph Stops Fly in Flight

See Front Cover

► THE UNUSUAL high-speed photograph of the common housefly in flight, shown on the cover of this week's SCIENCE NEWS LETTER, was made by Everett L. Gayhart in his home laboratory in Kensington, Md. Using an exposure of one hundred-thousandth of a second, Mr. Gayhart was able to make the fly—which moves at 170 wing beats a second—appear as though it is motionless.

To keep it in position, the fly was knocked out with a whiff of ether and then attached to a rod by a tiny drop of cement placed on its back. A stream of air was then blown toward the fly, which promptly pulled up its legs and beat its wings as if in flight.

Mr. Gayhart, a research scientist at the Applied Physics Laboratory of The Johns Hopkins University, Silver Spring, Md., uses high-speed schlieren photography to study the development of flames in their first millionths of a second of life.

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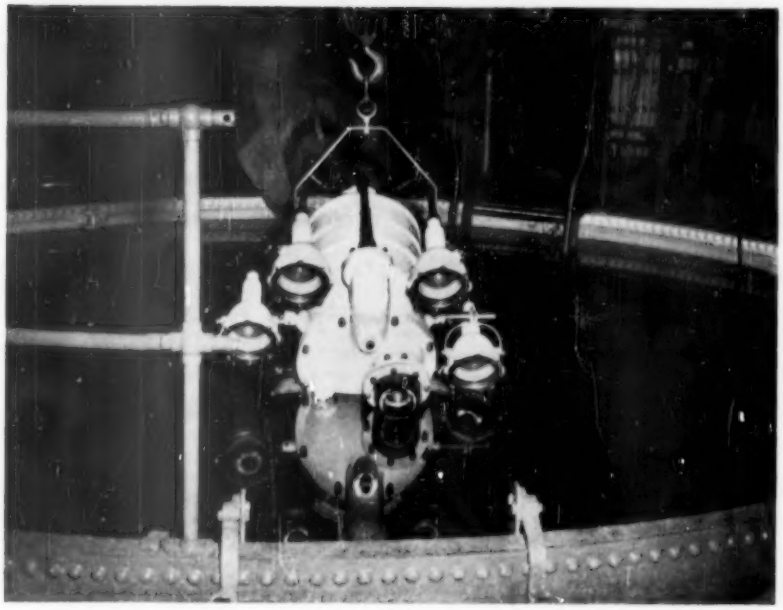

UNDERWATER TELEVISION—Being lowered into the test tank at the Siebe, Gorman works, Tolworth, Surrey, England, is the new underwater television camera, with pressure casing and viewing dome for the periscopic lens that can be swiveled without turning the camera.

TECHNOLOGY

Swivel Lens for TV "Eye"

▶ A SWIVEL lens has been designed in Chelmsford, Eng., that permits a television camera's "eye" to look around underwater while the camera itself stands still.

The new lens somewhat resembles a periscope. It consists of a tubular member that rotates about its axis through a complete circle. The "eye," or lens, on the end of the tube, can swivel through a 90-degree arc. The combined motion of the two elements thus permits the camera to view objects lying in a hemisphere about it.

Such a set-up has many advantages. It permits shipboard scientists to examine a large swath of underwater scenery without having to jiggle the camera into a new position for each scene. The lens is adjusted by remote switches to pick up the scene wanted.

The Marconi lens also helps the scientist keep the object on the ship's video screen when rough water causes the camera to swing to and fro.

The underwater television camera is housed in a watertight case. Its lens is protected by a clear, plastic-like dome that does not distort the picture. Scratches on the dome do not appear on the monitoring video screen.

Underwater television is becoming a useful tool of scientists and salvage companies. With it, the scientist can see the marine life for himself. He does not have to depend upon the verbal reports of a diver. Salvage companies have used it to spot sunken ships.

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ZOOLOGY

Biologist Defends Most Coyotes in Damage Cases

▶ MOST COYOTES, foxes and bobcats do not do damage to poultry and livestock, but destroy rodents and other harmful animals.

All the animals get the blame for damage done by only a small minority of wrongdoers, Frank Sampson, biologist of the Missouri Conservation Commission, has found in a survey of farm damage caused by predatory animals.

He discovered that 711 coyotes averaged $3.02 damage each, but all of the damage was caused by 29% of these coyotes. With red foxes, 886 had an average damage of $1.06 each, but only 20% of the foxes were involved. Seven percent of gray foxes and five percent of bobcats observed in the survey were responsible for all the farm damage credited to these animals. Trap the specific vandal, he advises.

Science News Letter, January 2, 1954

PHYSIOLOGY

Large Animals Require Less Food Per Pound

▶ POUND FOR pound of body weight, large animals use less food than small ones.

Dr. Robert E. Smith, physiologist at the University of California at Los Angeles Medical Center, is seeking the reason for this on a research grant from the U. S. Public Health Service.

"It is generally believed that a cellular mechanism which may be a basis of tissue activity may be an important factor in the phenomenon," he points out. "This mechanism in some manner apparently exercises control over the activity not only of cells but of animal tissues and the animal as a whole. Its operation appears to be related to the animal's total size."

Derangement of such cellular mechanisms may be involved in a number of clinical conditions generally classed under the heading of metabolic and degenerative diseases, such as rheumatic fever and gout.

Science News Letter, January 2, 1954

ASTRONOMY

Astronomers See First Telescope of New Design

▶ THE FIRST completed telescope of a new wide-eyed design was shown to astronomers at the dedication of the Arthur J. Dyer Observatory of Vanderbilt University, Nashville, Tenn.

The design ideas, developed by Dr. James G. Baker of Harvard Observatory, can be used to make wide-angle cameras out of many existing telescopes that normally cover very small fields. The new telescope is called a Baker reflector-corrector, and is similar to the wide-angle Schmidt telescopes.

Photographs taken with a Schmidt, however, have to be on special, curved plates, since the Schmidt has a spherical mirror. With the new telescope, the optics are so arranged that photographs can be taken on flat plates. The Vanderbilt telescope can also be converted into a conventional instrument by swinging the reflector-corrector lens out of the way and substituting another.

"The convertible feature, and the advantages of wide field, flat focal plane and short tube length, make the new Dyer Observatory telescope a unique and extremely versatile instrument," Dr. Carl K. Seyfert, director of the observatory, told astronomers attending the dedication ceremonies at the opening session of the American Astronomical Society meeting in Nashville.

Located about ten miles south of Nashville, the observatory was made possible through contributions of time, materials and money by 80 citizens and organizations of Nashville and vicinity. Special grants for the project, valued at $250,000, were received from the Research Corporation and the National Science Foundation.

Science News Letter, January 2, 1954

ANIMAL PSYCHOLOGY

"Gentled" Baby Rats Stand Stress Better

► BABIES WHO get T.L.C. (tender loving care) probably will be better able to stand stresses and less likely to develop heart trouble, high blood pressure or stomach ulcers when they grow up than babies not so gently handled. Studies in which baby rats were "gentled" for a few minutes every day seem to show this.

The studies were reported by Dr. Otto Weininger of the University of Toronto at the meeting of the American Association for the Advancement of Science in Boston.

The gentling consisted of holding the rat nestled in the scientist's hand close to his chest and stroking its back from the head to base of the tail.

These gentled rats gained more weight, their bones grew more and they were less fearful in a strange situation. When put under severe stress as adults, including being held immobile and without food or water for 48 hours, the gentled animals showed less damage to heart, blood vessels, stomach and intestines than the non-gentled ones.

Dr. Weininger explains the relative immunity to stress damage in the gentled animals as due probably to a decreased ACTH output from the pituitary gland, with consequently less release of hormones from the adrenal glands. The non-gentled rats showed heavier adrenal glands following stress than the gentled ones, bearing out this explanation.

A fundamental change in the relation between the thinking part of the brain and the part related to emotions apparently occurred in the gentled rats, resulting in a major change in the way the hypothalamus responded to alarming stimuli, he suggests. As a result, there was a reduction or blocking of massive sympathetic nervous system signals in response to alarm and consequently a decreased ACTH output from the pituitary.

Science News Letter, January 2, 1954

DERMATOLOGY

Shave and Haircut Takes 427 Days of Man's Life

► THE TIME spent on shaving and hair cuts takes 3,400 hours, or 427 working days, of the lifetime of the average American male, Dr. E. J. Van Scott of the U. S. Public Health Service's National Institutes of Health, Bethesda, Md., has calculated.

Dr. Van Scott called this time devoted to removing keratin from the skin in his report to the American Academy of Dermatology and Syphilology, meeting in Chicago.

Keratin is the substance that covers the entire surface of the body, is mostly thinner than tissue paper, and includes the hair and nails.

"How much time the average American woman spends on the decorative arrangement of her scalp keratin is hazardous to estimate," Dr. Van Scott said.

The keratin layer on the skin surface forms a natural barrier against bacteria. Lately, Dr. Van Scott said, there appears to have been an increase in skin irritations coincident with the use of soaps and detergents that attack the structural integrity of the keratin layer.

The amount of skin trouble caused by these synthetic detergents, sometimes called soapless soaps, is probably not much greater than that caused by strong, old-fashioned soaps, in the opinion of another dermatologist, Dr. George E. Morris of Boston. However, he likewise reported that they are one of the causes of housewives' eczema and may cause dryness, scaling, water blisters or secondarily infected sores of the hands. Soda clerks may be affected, he said, by the detergents used for cleaning glassware and dishes.

Some relief for these detergent-caused skin troubles may be had from silicone creams and ointments now on the market, Dr. Frank W. Crowe of the University of Michigan, Ann Arbor, Mich., reported.

The silicones are inert, water-repellent agents, he explained. At present they are thought to be the best protective material available for skin troubles caused by water and water-soluble products.

Science News Letter, January 2, 1954

INVENTION

Electronic Gunsight Gets Patent After 11 Years

► A STABILIZED electronic gunsight for airplanes has received its patent after an eleven-and-a-half-year wait.

Probably a forerunner to the still-secret sight that gave United Nations' pilots a great advantage over MIG pilots in Korea, the "stabilized tracking and fire control system" was held up from May, 1942, until now because of its military value.

The device is an improvement over other gunsighting devices which work well under "smooth" flying conditions, but which are not effective in high-speed maneuvers or when flying conditions are poor.

It uses gyroscopes, similar in principle to the string-walking variety that children play with, to feed gunsighting information into its computer. The target dimension, the indicated air speed of the craft, altitude of the craft, present position of the target relative to the craft, and the rate at which the target is changing its position relative to the craft, are all fed into the computer along with gun azimuth data. Then the guns can be aimed to riddle a future position of the target with bullets.

The device was invented by Carl G. Holschuh, Glen Head, N. Y., Edmund B. Hammond Jr., and Walter T. White of Brooklyn, N. Y. The device received patent No. 2,660,793, assigned to The Sperry Corporation.

Science News Letter, January 2, 1954

IN SCIENCE

PALEONTOLOGY

Prehistoric Mexicans Stoned Elephants

► A STRANGE fossil find in Mexico that may be evidence for a stoning to death of elephants by prehistoric Americans is reported by Dr. Helmut de Terra, Columbia University geologist, discoverer of Mexico's famous Tepexpan Man who lived 11,000 years ago.

Two pairs of elephant tusks, perfectly preserved, were excavated from a pocket in a pumice sand quarry, along with bones of camels, horses, bison, birds, carnivores, rodents and other animals. Above and below the elephant tusks, which were matching and perfectly preserved, were boulders. Some of the other bones were broken up, as though human beings had eaten the flesh that once was upon them.

Dr. de Terra suggests in his report to *Science* (Dec. 18, 1953) that the larger animals were slain by prehistoric men catapulting the boulder down upon the beasts bogged on a lake shore. No human skeletons, tools or old campfires were found in the area to verify the impression that early man was actually responsible, but he suggests that further finds may clear up the mystery.

The new find was excavated by the same scientists of the National Institute of Anthropology and History of Mexico, Luis Aveleyra, M. Maldonado-Koerdell and Arturo Romano, who made earlier excavations of a mammoth and human artifacts in the region where Tepexpan Man was found.

Science News Letter, January 2, 1954

MEDICINE

Mold Remedies May Change Heart Rhythm

► A HINT that aureomycin and perhaps other antibiotics, or so-called mold remedies, may affect the rhythm of the heart beat appears in studies reported by Drs. Paul A. Harvey and Wei Yang of San Francisco State College to *Science* (Dec. 18, 1953).

Frog and turtle hearts, isolated from the animals' bodies, showed rhythm changes when treated with aureomycin, they found. Contractions of the heart muscle were first augmented and then retarded under the aureomycin treatment.

Whether this and other antibiotics have a similar effect on human hearts is not reported by the California scientists who point out that information on this is "very meager, despite the hazards involved in their therapeutic use without this knowledge."

Science News Letter, January 2, 1954

CE FIELDS

GENERAL SCIENCE

Duane Roller Is Named Editor of Science Journal

► DR. DUANE ROLLER, physicist, has been named editor of *Science* and the *Scientific Monthly*, published by the American Association for the Advancement of Science.

The position has been filled temporarily for several months by Dr. Bentley Glass, professor of biology at the Johns Hopkins University.

Dr. Roller has been assistant director of Hughes Aircraft Research and Development Laboratories in California, and he has taught physics at the University of Oklahoma, Hunter College and Wabash College. He founded and for 15 years was editor of the *American Journal of Physics*.

He is a member of the governing board of the American Institute of Physics and a member of the board of trustees of SCIENCE SERVICE.

Science News Letter, January 2, 1954

AERONAUTICS

Rockets May Whisk Freight Across Oceans

► TODAY'S GUIDED missiles may shed their military armament in the "peaceful future" to become economical freight carriers over long distances, Lt. General D. L. Putt, commander of the Air Force's Air Research and Development Command, reported to the American Rocket Society meeting in New York.

Speaking on "Long Range Applications of Rocket Power," Gen. Putt said the missiles, guided and unguided, already are finding their places in scientific research. He said the commercial and civilian possibilities for them are legion.

As early as 1931 an Austrian engineer made several successful "mail deliveries" to remote areas by rocket. This sparked the imaginations of inventors for a while, but little has been heard of such schemes in recent times, he reported. Nevertheless, Gen. Putt said it may become possible to move not only mail but freight across continents or oceans by rockets traveling at "terrific" speeds and at low costs.

Gen. Putt also told the rocket engineers he foresees the day when the guided missile will replace the bomber airplane, relegating the latter to a mere logistical vehicle. In the same spirit, guided rockets will replace anti-aircraft batteries.

"Spectacular" German rocket projects were discovered by the Allies at the close of World War II. Among them was the "Natter," a piloted rocket interceptor designed to go straight up to seven miles altitude in 60 seconds, he said.

However, Gen. Putt reminded the engineers that the Russians captured great masses of technical data from Germany just as America did after the war. Knowledge of Russia's current position in the field of rocketry is "quite limited."

"There is little doubt that the Soviets are pursuing their missile program with equal vigor and success, using some of the foremost German experts to help them try to outdevelop and outproduce us," Gen. Putt added.

Science News Letter, January 2, 1954

PSYCHIATRY

To Certify Doctors as Mental Hospital Heads

► LATEST STEP taken by the American Psychiatric Association to raise standards of treatment and care of mentally sick persons is to set up a committee to certify "qualified mental hospital administrators."

The Committee will conduct examinations periodically and issue qualification certificates to successful applicants. The object is to help insure that the chief executives of mental hospitals shall not only be physicians adequately trained in psychiatry, but that they shall also be skilled in business and personnel management, community relations, budget control, procurement and other essential administrative techniques.

Ever since 1844, the Association has maintained that the chief executives of mental hospitals must be physicians specialized in psychiatry. The Association regards as unsound proposals to separate "administrative" from "medical" responsibility in the hospital, with corollary suggestions that doctors should confine themselves to medical matters only. It believes that all mental hospital operations bear a direct relation to the progress of a patient, and accordingly, that only a physician may assume total responsibility for them.

Science News Letter, January 2, 1954

WILDLIFE

Missing Rare Cranes Land at Texas Refuge

► THREE MISSING whooping cranes have landed at the Aransas National Wildlife Refuge in Texas, bringing the total number of cranes to 24, a gain of three over last spring. (See SNL, Dec. 5, 1953, p. 365.)

The three missing birds were photographed in Saskatchewan, Canada, in November when 21 birds had already landed at the refuge. Since that time, no authentic report of the birds had been heard.

Richard E. Griffith, biologist in the refuge division of the Fish and Wildlife Service, said that no further information on these whooping cranes was available.

Science News Letter, January 2, 1954

ASTRONOMY

Name Asteroid for Planetarium Designer

► THE DESIGNER of most of the big planetaria in use in the United States, Dr. Walter Bauersfeld of Oberkochen, Wurttemberg, Germany, has a minor planet named in his honor, Dr. Paul Herget of the Cincinnati Observatory has announced.

Planetaria are elaborate projection devices by which images of the stars and planets visible to the naked eye are projected upon a large dome, giving the audience seated below a realistic effect of the night sky. They can reproduce the skies as seen from almost anywhere on earth at any time in the past, present or future.

Dr. Bauersfeld, who will be 75 on Jan. 23, 1954, is now at the Zeiss-Opton works in Oberkochen. Until World War II, all planetaria were made in Germany, but some have now been made in the United States.

The minor planet, or asteroid, now named for Dr. Bauersfeld was discovered by Dr. K. Reinmuth of Heidelberg, Germany, on Jan. 13, 1940, and was previously known only by its number, 1553.

Science News Letter, January 2, 1954

FORESTRY

Lightning, Drought Bring Fires to National Parks

► LIGHTNING AND drought combined in 1953 to give National Park Service firefighters a hazardous and busy time, Conrad L. Wirth, director of the park system, reported to Secretary of the Interior Douglas McKay.

More lightning-caused fires struck the national parks in 1953 than in any previous year for which there are records, Mr. Wirth said. A bright side to the forest fire picture was a drop in the relative number of man-caused fires.

Lightning without rain started 32 fires in a three-day period at Yosemite National Park during September. Rangers and special crews in Yellowstone Park during the summer found themselves fighting 30 fires at one time, Mr. Wirth said.

A total of 14,700 acres of park land was burned. Of this, 6,200 acres were forested and the remainder was brush land.

Half of the man-caused fires were started by park visitors. Mr. Wirth said that without greater caution from the public during the drought the fire conditions would have been much worse.

In fighting the fires, the park service used Indian crews which were transported by air to the worst fires. At the height of a Yosemite fire, one Indian was heard to remark, "Let's give the country back to the white men."

The total number of fires last year was less than average. Mr. Wirth said that public education on the danger of forest fires was responsible for the decline.

Science News Letter, January 2, 1954

GENERAL SCIENCE

Science Forecast for 1954

Atomic submarine afloat during coming year. Guided missiles take up guard in Europe and Arctic. Conquest of polio may be proved.

By WATSON DAVIS

▶ IN THE months ahead in 1954, the world's first atomic submarine will be afloat, ushering in a new marine era, first for war and later for peace.

Guided missiles, some of them capable of carrying atomic bombs, will take up their positions in defense of the western world. They will both protect our great centers of population and stand guard in Europe and the Arctic.

A decade of secret research and production will come to fruition, as the radar-controlled pilotless craft will be constantly upon the alert to perform the interception of an attacking plane that would elude even our fastest piloted supersonic jets.

There will be more thermonuclear explosions, in the Pacific, to warn the world that it has within its own hands the mechanism for civilization's destruction. From behind the Iron Curtain, radioactive particles in the air would bring news of answering gigantic hydrogen bomb explosions. This will warn us that if there is to be real security for the world, two different ideologies must start talking to each other in earnest and work out ways to live upon the same globe.

We shall not know of many things that will strengthen our military defense in the months ahead, for much of our progress in fashioning new and novel weapons are kept military secrets.

Polio Vaccine Test

In the fields of science and research where progress can be more freely reported, it seems likely that a major medical conquest can be achieved. There is great hope that, through vaccinating a million children and comparing their polio rate with a similar untreated group, there will be demonstrated in 1954 the effectiveness of the polio vaccine against all types of this virus disease.

Following the interesting theories developed in 1953, we may come closer to the secret of life that is contained in the chemical molecules within the dividing cell. More theory and some experimentation on suggested mechanism of cell duplication may even give medical scientists new ideas of developing treatments for disease.

The inquiries into the number one cause of death, the diseases of the heart and circulatory system, will continue. There is always the chance that out of the chemical research and work with actual patients some useful methods of prevention and treatment will arise. These may be based upon a better understanding of the constituents of the blood.

Cancer will be under continual attack. Most important will be the wide-flung attempts to understand the nature of this disease which takes many forms and probably has many specific causes. Treatment of the victims of the disease will be bettered, particularly by the use of larger amounts of radioactive cobalt 60. Amounts equivalent to hundred-pound lots of radium and more than 25 times as radioactive as radium will be used in cancer treatment centers. This is a medical by-product of atomic energy.

Steroid Hormone Metabolism

Other developments that are foreseen by some of the experts consulted by SCIENCE SERVICE as to what is likely to happen during 1954 include:

There will be marked advances in the knowledge of steroid hormone metabolism. This will allow tests for steroids to tell what the adrenal gland has produced before the hormones undergo metabolism in the tissues.

Something new about copper metabolism in patients with Wilson's disease, a degenerative disorder of the brain and liver, may be developed during the coming months.

The startling rise in early juvenile delinquency will lead to intensification of research into the normal behavior developmen of the pre-adolescent and early adolescent years.

General and pediatric medicine will give increased attention to the mental health of the family and its younger children.

Influence of Heredity

There will be inquiry into the influence of hereditary and constitutional factors in determining the potentials of normal and delinquent behavior.

A demonstration is probable that problem-solving by groups is not likely to be superior to that of individuals in the area of human relations.

Exploding atoms will continue to give new knowledge. Radiation detection devices in the form of scintillation counters will greatly extend the use of radioactive tracer atoms for many types of laboratory research, medical diagnosis and industrial applications.

Radioactive dating based upon the long life of carbon 14 will continue to give us new surprises about the past history of civilization.

Because radiation from outer space of all sorts has a great influence upon not only our knowledge of the universe and our philosophies, but also upon the actual physical conditions here on earth, studies on cosmic rays, the supper atmosphere and radiation from outside the earth will be intensified.

Still more accurate weather predictions will be possible through further refinements of mathematical models of the atmosphere. Numerical weather forecasting will become operational and will be issued on a routine basis. Rough mathematical models designed for long-range weather forecasting will be tried out.

The exploration of the universe by means of radio waves that are emitted from various regions of the sky will be continued. It is expected that the Andromeda galaxy will be shown to be much larger when measured by the 21-centimeter radio waves that it emits than by light, just as last year radio observations showed the Magellanic clouds to be much larger.

Cathode-ray screens will replace the photographic plate in recording with electronic

FUTURE AIRPLANE MODEL—To determine its flight characteristics, this model is being readied for wind tunnel tests at a field station of the National Advisory Committee for Aeronautics.

receivers what is observed through telescopes.

The true nature of the variable stars in the Magellanic clouds are likely to be identified.

Astronomers will establish more accurately the new scale of the universe which roughly doubles linear distances, and, therefore, doubles the age of the exploding universe.

It is probable that a new formulation of what an elementary particle consists of will be offered during the year.

There may be more understanding of the superconductive state which causes electricity to flow so easily in metals at very low temperature.

Within our own earth, there will be new information and theories upon the fluidity of the earth's core. There may be convincing demonstration of how the continents originated.

The electronic "brains" which have had such development in the last decade will grow still more and become more useful.

Computing machines will make use of magnetic elements as active components replacing tubes and transistors. Significant improvements in reliability of electronic systems in aircraft armaments will be attained through correlated design.

Color television may arrive on actual broadcast schedules. Tape recording of television is likely to have its firs practical broadcast use during the year.

The great jigsaw puzzle of man's origin will have more pieces fitted into it. Africa is the great continent of opportunity in anthropology. There are likely to be further interesting finds in Africa of ancient man and his cultures.

Science News Letter, January 2, 1954

ICHTHYOLOGY

Activity of Fish Told by Gill Size

▶ IF YOU ever wonder how much vitality a fish has, do not look at his muscles. The size of its gills is what counts.

Fast-moving, active fish, such as the mackerel and menhaden, are also fast breathers. They require a large gill area for their oxygen intake. Only sluggish, lazy fish, which rest and feed at the bottom of the ocean, like toadfish and flounder, can afford to grow small gills.

After measuring the gill surfaces of some 30 species of fish, Dr. Irving E. Gray, professor of zoology at Duke University, Durham, N. C., found at one extreme that the ocean-swimming mackerel carried an average of 1,617 square inches of gill surface for each pound of flesh. At the other extreme, the slow-moving toadfish carried only 127 square inches to the pound.

This difference means essentially one thing. If the toadfish were to swear off sedentary ways and attempt to take up the adventurous life of the mackerel, he would never make a go of it.

Science News Letter, January 2, 1954

How to Stop Worrying

HOW TO PAY FOR

YOUR SON'S OR DAUGHTER'S COLLEGE EDUCATION

EVEN if you don't think you can save another dollar these days, and you're wondering how you're going to get together $5000 cash for your son or daughter—the minimum cost of a four years' college education today—

George Adams' big new book *How to Afford That College Education—and Where to Study* definitely and clearly tells you *what to do to assure your child his (or her) college education.*

In his details about 970 American colleges and universities, he tells you all about the loan funds, work-study plans, employment opportunities, the plans to cut tuition and living expenses, and the many other ways that virtually guarantee a college education to anyone who really wants one.

He shows clearly how you and your child can swing the last three years of college, if you can meet the irreducible cash needs of the first year. He shows how to provide for these cash needs *out of current income,* and he even shows clearly how you can build up a college nest egg for your younger boy or girl through the right savings and insurance plan.

This book does even more:

—it tells how to find the best college for your son and daughter, the one that will give them the best training considering their talents, abilities, and the future career they want. With the help of this book's rating chart, you can stop worrying "Which college?" and can open the way to a successful, well-paid career for your child.

Of course you get details, briefly, about each of America's 970 leading colleges and universities; their costs, courses, location, the help they give parents and students in cutting cash needs and expenses.

And your son or daughter learns still more: proved ways to earn one's way through college, proved campus businesses any intelligent college student can start, pre-college jobs from which a boy can save a full year's college expenses, the best kind of vacation jobs (combining vacations with good pay), etc.

You'd think it worth while spending $25, $50, even $100 if you could visit a college adviser and get from him even a fraction of all the facts in George Adams' *How to Afford That College Education—and Where to Study.* So, when you're told this book costs only $2 on a money back guarantee if not satisfied, why wait?

To do the best you can to assure your child's college education and his success in life, send $2 (cash, check, or money order) with name and address and ask for "college book." Mail to:

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• Books of the Week •

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N. W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

ADAPTATION IN MICRO-ORGANISMS—R. Davies and E. F. Gale, Eds.—*Cambridge University Press*, 339 p., illus., $6.00. The ways in which an organism can adapt to a changing environment include the medically important ability of a germ to become resistant to drugs. Papers presented at a symposium in London.

BIBLIOGRAPHIES FOR PROFESSIONAL PUBLICATIONS—Emmett Albert Betts—*Reading Clinic, Temple University*, 10 p., paper, 25 cents. Proposing a standard form for bibliographic entries.

BIOCHEMISTRY AND PHYSIOLOGY OF NUTRITION: Volume II—Geoffrey H. Bourne and George W. Kidder, Eds.—*Academic Press*, 641 p., illus., $15.00. The 12 papers in this volume are contributed by specialists in this field. Volume I came out last year. (See SNL, Oct. 10, 1953, p. 236.)

CARE AND BREEDING OF BUDGIES—Cyril H. Rogers—*Dover*, 93 p., illus., paper 65 cents, cloth $1.75. Introducing a new hobby, that of breeding and keeping shell parrakeets.

A CORRELATION OF SEWAGE CHLORINE DEMAND DATA—Linvil G. Rich, Robert E. Opferkuch, Jr. and Charles E. Williams—*Virginia Polytechnic Institute*, Engineering Experiment Station Series No. 87, 12 p., paper, 25 cents.

DETERMINATION OF HAZE AND SMOKE CONCENTRATION BY FILTER PAPER SAMPLERS—W. C. L. Hemeon, George F. Haines Jr. and Harold M. Ide—*Mellon Institute*, 8 p., illus., paper, free upon request to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa. Discussing a method for evaluating the concentration of fine particles, as in smoke, in the atmosphere.

CRYSTAL GROWTH AND DISLOCATIONS—Ajit Ram Verma—*Academic Press*, 182 p., illus., $5.00. Modern techniques have destroyed the beautiful illusion of early crystallographers with regard to the symmetrical perfection of crystals.

EXPLORATIONS IN PSYCHOANALYSIS — Robert Lindner and Clement Staff, Eds.—*Julian Press*, 308 p., illus., $7.50. Essays written in honor of Theodor Reik on his 65th birthday.

GREEK CIVILIZATION AND CHARACTER: The Self-Revelation of Ancient Greek Society—Introduction and Translation by Arnold J. Toynbee—*New American Library*, 158 p., paper, 35 cents. Reprint of a book originally published in the series, the Library of Greek Thought.

GROWTH OF PROTOZOA—S. H. Hutner and others—*New York Academy of Sciences*, Vol. 56, Art. 5, 280 p., illus., paper $4.50. Dealing with two main advances in protozoa techniques and the results which they have made possible.

HUNTING WITH THE MICROSCOPE—Gaylord Johnson and Maurice Bleifeld—*Sentinel Books*, revised ed., 131 p., illus., paper, 60 cents. Introducing the young scientist and the hobbyist to the new world of "big game" to be found beneath a pocket lens or microscope.

THE IMPORTANCE OF INDUSTRIAL MEDICAL DEPARTMENTS AS A MANAGEMENT TOOL—Daniel C. Braun—*Mellon Institute*, 4 p., paper, free upon request to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa. Evaluating the medical department in modern industry.

INTRODUCTION TO A STUDY OF MECHANICAL VIBRATION—G. W. Van Santen—*Philips' Technical Library*, 296 p., illus., $7.50. Reviewing the elementary theory of vibration as well as some of the more important problems, from ultrasonics to earthquakes, encountered in practice.

MEASUREMENTS OF DOUBLE STARS—G. Van Biesbroeck—*University of Chicago Press*, Publications of the Yerkes Observatory, Vol. VIII, Part VI, 223 p., paper, $10.00. Since his last list was published in 1938 the author has continued his measurement of double stars although he reached emeritus age in 1945.

NEEDED URBAN AND METROPOLITAN RESEARCH —Donald J. Bogue, Ed.—*Scripps Foundation for Research in Population Problems, Miami University*, and *Population Research and Training Center, University of Chicago*, 88 p., paper, $1.25. An abstract of seminar discussion dealing with the information needed about modern cities.

THE PAPERS OF WILBUR AND ORVILLE WRIGHT: Vol. I: 1899-1905, Vol. II: 1906-1948 —Marvin W. McFarland, Ed.—*McGraw-Hill*, 1278 p., illus. $25.00. These papers, which include correspondence between Wilbur Wright and Octave Chanute, appear at a timely moment to celebrate the fiftieth anniversary of the first successful powered flight.

PROCEEDINGS OF THE THIRTY-SECOND ANNUAL MEETING—Fred Burggraf and Walter J. Miller, Eds.—*Highway Research Board*, Publication 271, 616 p., illus., $8.50. Papers of interest to highway engineers presented at the annual meeting.

REASON AND NATURE: An Essay on the Meaning of Scientific Method—Morris R. Cohen—*Free Press*, 2nd ed., 470 p., $6.00. Incorporating many revisions and corrections by the author.

THE RELATION OF LEAN BODY WEIGHT TO METABOLISM AND SOME CONSEQUENT SYSTEMATIZATIONS — Albert R. Behnke — *New York Academy of Sciences*, Vol. 56, Art. 6, 47 p., paper, $1.25. A method for estimating lean body weight from basal metabolism and vice versa.

SERGEI N. WINOGRADSKY, HIS LIFE AND WORK: The Story of a Great Bacteriologist—Selman A. Waksman—*Rutgers University Press*, 150 p., illus., $4.00. Biography of a leading Russian scientist who pioneered in the field of soil bacteriology. The author is himself an outstanding leader in this field.

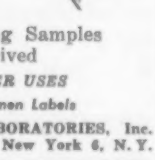
A THEORY FOR THE BENDING OF RECTANGUAL BEAMS INCLUDING THE EFFECTS OF SHEAR AND NORMAL PRESSURE — Dan Frederick — *Virginia Polytechnic Institute*, Engineering Experiment Station Series No. 86, 14 p., paper, 25 cents.

VOICES OF THE NIGHT—P. P. Kellogg and A. A. Allen—*Cornell University Records*, $6.75. The calls of 34 frogs and toads of the United States and Canada on two sides of a single 33 1/3 RPM plastic record.

WESTWARD HO WITH THE ALBATROSS—Hans Pettersson—*Dutton*, 218 p., illus., $4.00. The Albatross Expedition, led by the author, was a 15 months' circumnavigation of the globe to study the riches under the sea.

Science News Letter, January 2, 1954

Sequex Labels



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MEDICINE

Red Blood Cells Help On Germ Scavenging

► RED BLOOD cells under some circumstances help the scavenger cells of the body dispose of disease germs by the process called phagocytosis.

Discovery of this new role for the blood's red cells was made by Dr. Robert A. Nelson Jr. of Johns Hopkins School of Hygiene and Public Health, Baltimore, and the Naval Medical Research Institute, Bethesda, Md. It is reported in *Science* (Dec. 18, 1953).

It is effective for the germs of syphilis, pneumonia, dysentery, typhoid fever, boils and tuberculosis and perhaps for others so far not tested.

What happens is that the germs adhere to the surface of the red blood cells. This may make it easier for the scavenger cell to trap the germ. Or substances from the surface of the red blood cell may coat the germ, making it more susceptible to phagocytosis.

The special circumstances in which the germs adhere to the red blood cells are those in which antibodies to the germs are present and in which there is also present a substance in normal blood serum, probably the one known to bacteriologists as complement.

The fact that the red cells play this part in an immunologic reaction with a disease germ, antibody and complement should, Dr. Nelson believes, help scientists studying resistance to infection and may lead to development of diagnostic tests. For example, preparations of red blood cells and disease germs might be used to detect antibodies to the germs.

Science News Letter, January 2, 1954

PUBLIC SAFETY

Freak 1953 Accidents

► A LAWNMOWER shot a man. A squirrel hit another over the head. A dog tried to park his owner's car. An antique exploded in a living room.

These are just a few of the freak accidents that happened in 1953, according to Paul Jones of the National Safety Council in Chicago, who has rounded up the year's most unusual accidents.

Robert Heinbaugh of Painesville, Ohio, was innocently mowing his lawn when he was shot in the toe. The mower ran over a cartridge.

In Memphis, Tenn., J. C. Lightfoot stood under a tree enjoying the outdoor air, struck by the beauty of nature. He was struck by something else, an ear of corn thrown by a squirrel above. Mr. Lightfoot went home with a long, deep gash in his head.

Mrs. Jewell Norman left her car with the motor idling one day in Lincoln, Nebr. Her dog got behind the wheel, pawed the gear shift a bit, and backed into another car.

The "last" shot in the Civil War was fired in the living room of the Ishmael Lynch home in Port Gibson, Miss., this year. A shell found long ago on a battlefield, fell from the mantel and exploded, blasting holes in the floor, walls and ceiling.

Many a man has been saved, as the saying goes, by the seat of his pants. David Causey of Tuscaloosa, Ala., can say that literally. His car went out of control and came to rest hanging over a railroad overpass. Mr. Causey was thrown out. The seat of his trousers snagged on the underpart of his car, and he was left dangling 60 feet over the tracks.

Naturally there has to be a pun. In Santa Barbara, Calif., a car driven by Thomas F. Coffey collided with one driven by Ben Pott. Police made no arrests. No grounds.

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GEOPHYSICS

Shortwave Radio in 1953

► IF YOU thought shortwave reception was good last year, thank not only your set, but the ionosphere, the earth's radio reflecting roof for transmitting shortwave messages around the world.

Experts at the National Bureau of Standards have reported that shortwave reception was good three-fourths of the time during 1953.

When listening conditions were poor, due to disturbances in the ionosphere, the radio specialists correctly anticipated four out of five of these storm days. For every ten storms that they forecast, six materialized. Their ability to predict what the reception is going to be during the seven days following the forecast is shown by the fact that 83% of all the predictions they made, including both stormy and quiet periods, were "satisfactory or perfect."

Forecasting ionospheric storms correctly is of great importance in warning when urgent shortwave messages must be rushed through. Disturbances in the earth's outer atmosphere can disrupt shortwave radio communications continuously for one or two weeks. These storms cause weak signals, fading and occasional blackouts of shortwave communications.

The shortwave forecasts, specifying reception conditions for the following seven days, are issued twice a week by the radio experts at the National Bureau of Standards. They are based on information gathered from all over the world and tailored for reception of broadcasts from London, Moscow and Berlin.

During the last two years, up-to-the-minute forecasts designed to cover signals reaching Alaska from the Orient or western United States have been issued from Anchorage.

The Bureau of Standards also issues short-term predictions of shortwave radio reception conditions four times a day by way of signals broadcast from its radio station, WWV. Of these, 92% were "satisfactory or perfect," the radio experts report. Only four percent of the storm periods actually occurring were not anticipated. Eight out of ten of the storms they forecast would occur, actually did plague shortwave operations.

Science News Letter, January 2, 1954

ENTOMOLOGY

Four Locust Generations Develop Without Fathers

► FOUR GENERATIONS of fatherless female desert locusts have developed in the laboratory of Dr. A. G. Hamilton, St. Thomas' Hospital Medical School, London.

Dr. Hamilton reports in *Nature* (Dec. 19, 1953) that the fatherless locusts live much longer than sexually produced control specimens.

Fatherless development is called parthenogenesis, and when the result is always female, it is said to be thelytokous. The original desert locust, *Schistocerca gregaria*, females in the experiment were sexually produced, but were separated and have not been in cages with male locusts since.

The parthenogenetic females are normal in most respects, Dr. Hamilton said. The interval, however, between emergence to adulthood and the laying of the first egg-pod is longer for the fatherless females than for others.

Eggs produced parthenogenetically are much less fertile than normal eggs and only about one-quarter hatch. Three-quarters of the normally produced eggs usually hatch.

Dr. Hamilton suggested that this ability for parthenogenetic reproduction plays a part in the preservation of desert locusts when they are isolated in the solitary phase of development. Parthenogenesis of the thelytokous type has been observed in other locusts and grasshoppers.

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SPELEOLOGY

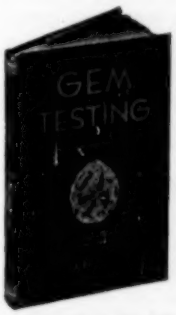
Amateur "Spelunking" Can Aid Scientists

► "SPELUNKING," the exploration of caves by amateurs which has become popular recently, can add much to scientific understanding of the history of man in North America, Brother G. Nicholas, F.S.C., of Cumberland, Md., reported at the meeting of the American Association for the Advancement of Science in Boston.

He pointed out that caves have been neglected as objects of scientific study in recent years. The importance of cave exploration is emphasized by the discovery in Sandia Cave, N. Mex., of evidence of man living there 15,000 years ago.

There are an estimated 5,000 known caves in the United States, most of which have not been studied scientifically, Brother Nicholas said. New discoveries are also being made in caves which have been studied before. The scientific study of caves is called speleology.

Science News Letter, January 2, 1954



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NUTRITION

Diet May Affect Polio Susceptibility

► A HINT that susceptibility to poliomyelitis may be affected by diet has appeared in studies by Drs. A. F. Rasmussen Jr., Robert W. Weaver, C. A. Elvehjem and Paul F. Clark at the University of Wisconsin. (Dr. Rasmussen is now at the University of California Medical School at Los Angeles.)

The studies were made with monkeys and are, in the words of the scientists, "obviously of a preliminary nature." But the scientists think the results so far suggest that this approach to modifying susceptibility to polio should be explored further.

Earlier these scientists had found that mice that were not getting enough of the amino acid, tryptophan, in their diet were partially protected against the Lansing polio virus.

Now they find that the same is true for monkeys. This seems especially significant because monkeys are so much closer to humans and, until relatively recently, were the only non-human animals that got polio.
given in a sweetened suspension that the

In these experiments, the polio virus was animals drank. This got the virus into their bodies through a natural portal of entry.

The low-tryptophan diet did not protect all the monkeys. In one experiment, two out of nine escaped paralytic infection, though all nine control animals got paralysis. The disease took longer to develop in all the special diet monkeys and the feverish beginning stages were less pronounced. The two that escaped paralysis apparently did get infected, because they were able later to resist a large dose of polio virus given by injection into the brain.

In two other experiments, with smaller amounts of virus, fewer control monkeys got paralysis and of the special diet group, only one of 20 became paralyzed.

Details of the experiments are reported in the *Proceedings of the Society for Experimental Biology and Medicine* (Nov., 1953).

Science News Letter, January 2, 1954

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ECOLOGY

NATURE RAMBLINGS

Guardians of the Snow

► CONIFER TREES and snow always seem to belong together.

However, conifers are by no means confined to the lands of snowy winters, but so ineradicable is the picture of snow-surrounded evergreens that when Rudyard Kipling wanted to pack the geographical grandiosity of the British Empire into a single phrase, he wrote of "dominion over palm and pine."

Although it is true that the coniferous trees can be found in lands that reach toward the sun (in our own South, they dispute dominion with at least one kind of palm!), nevertheless they do belong first to the North. Or perhaps it would be more proper to say that the North belongs to them.

They circle the boreal end of the earth like a dark-green garland. They are the last trees that look upon the desolate tundras that run to the Arctic sea. Willows and poplars and birches push toward the North, too; but they surrender and dwindle to bushes, while the spruces still stand up as trees.

Incidentally, Kipling limited the northern extent of his Empire unnecessarily, although probably quite unconsciously, when he made the pine the symbol of the North. Spruces run far to the north, beyond the last of the pines, just as the pines leave the spruces behind in their southerly extension. Their ranges overlap, but it is the spruce that in general stays within the circle of deep annual snow.

There is good reason for that, for the snow is more necessary to the spruce than it is to the pine. Some of the evergreens—and pine and juniper are outstanding among them—can stand a good deal of drought. Not all kinds of pine; but there are enough dryland pines to make good forests in lands where the slow seep of melting snow never figures as a source of ground water.

Not so the spruces, however, nor yet their cousins the firs. They are rather more particular than most pines, and seek the more moist regions. Where they grow in competition with pines, the spruces and firs cling to the shady, damp sides of ravines. Lands that they dominate are usually found to be perennially moist.

In part, these conifers attend to that themselves, for their dense foliage makes a superior shade for the snow that lies under their canopy, holding it against the ardor of the spring sun and permitting it to melt only slowly—and to the advantage of their roots.

Science News Letter, January 2, 1954

SURGERY

Stomach Cancer Survival

► PATIENTS WITH stomach cancer now have twice the chance of surviving five years that they had a decade ago, thanks to more extensive operations now performed to remove the cancer, Dr. Charles H. Brown of Cleveland reported at the American Medical Association meeting in St. Louis.

"Only one-fourth of the patients with gastric carcinoma were given a chance for a five-year survival in 1940-45, while now more than half of the patients are given that chance," he said. "Without resection [removal of all or part of the stomach], the outcome is inevitably fatal."

Improved surgical techniques today make possible operations which were not undertaken a decade ago. The operability rate in the Cleveland Clinic rose from 57% in 1940-45 to 90% in 1952, he reported. At the same time, the percentage of patients who underwent resection rose from 25% to 55%.

The type of operation has changed considerably. In the 1940-45 period, 85% of the patients underwent a partial removal of the stomach and eight percent had a total removal. In seven percent of the cases, stomach resection was accompanied by the removal of some other organ. In 1952, subtotal resections were down to 41%; total removals rose to 18%, and complicated resections increased to 41%.

This more extensive operation is important since it has been shown that some patients have been five-year survivors with local extension of the disease to some other organs. Dr. Brown also predicted:

"Further improvement will have to come either from some new simple test for earlier diagnosis, enabling the surgeon to operate upon less advanced lesions, or from some entirely new treatment, such as different radioactive materials and radioactive isotopes that would be specific for the gastric neoplastic [cancer] cell."

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VIROLOGY

Virus Sizes Go Up in Fours

➤ VIRUSES PROBABLY have no knowledge of the multiplication table, but their sizes seem to go up by fours. Comparisons of virus measurements showing this have been made by Dr. Alfred Polson of the South African Council for Scientific and Industrial Research and the University of Cape Town Virus Research Unit. He reports them in *Nature* (Dec. 19, 1953).

The viruses he studied fall into three groups according to the way they settle out when spun in high speed centrifuges. In one group belong the viruses of foot and mouth disease and lumpy skin disease. In the next are Theiler's virus, the Coxsackie virus, polio virus and yellow fever virus. In the third group are viruses of horse-sickness and Rift Valley fever.

Electron microscope pictures of animal viruses show that they are apparently all spherical in shape. Thus their volumes and particle weights are proportional to the cube of their diameter. Figured on this basis, Dr. Polson finds that the volumes of the viruses are in the ratio one to four to 16.

This, Dr. Polson says, suggests that the viruses in each group may be built from the same number of sub-units, which may differ in composition but have approximately equal volumes.

Dr. Polson has separated non-infectious sub-units from preparations of rabies virus. The diameter of these is estimated as 11 to 13 millimicrons, close to the 12 millimicron diameter estimated by another group of scientists for non-infectious sub-units of influenza virus.

The smallest virus particles, those of foot and mouth disease and lumpy skin disease, have volumes almost four times that of the sub-unit of influenza virus, Dr. Polson calculates.

"It is therefore tempting," he states, "to conclude that sub-units of this size form the basis of virus structure."

On that basis, there would be four sub-units for foot and mouth disease and lumpy skin disease virus particles, 16 for Theiler's, Coxsackie, polio and yellow fever viruses, and 64 for African horse-sickness and Rift valley fever viruses.

Science News Letter, January 2, 1954

MEDICINE

Possible Adenoid Virus

➤ ADENOIDS REMOVED from children having routine tonsil and adenoid operations have given medical scientists a new mystery, or at least a puzzle.

Because from these adenoids they have isolated an "agent" that might be a virus and might be the cause of some of the colds children get so frequently.

Then again, the "agent" might not be a virus. Even if it is a virus, it might not be disease causing.

Discovery of this mystery "agent" and the puzzling features of it were presented at a meeting of the Society of Hygiene of Johns Hopkins University in Baltimore by Drs. Robert J. Huebner and Wallace P. Rowe of the U. S. Public Health Service National Institutes of Health, Bethesda, Md., and Dr. Thomas G. Ward of the Johns Hopkins School of Hygiene, Baltimore.

The mysterious adenoid virus was discovered by accident. The scientists had decided that adenoid tissue, coming from back of the nose and throat, might be good stuff on which to grow viruses obtained from the noses and throats of people with colds, in the continuing search for causes of common colds and similar respiratory diseases.

So the scientists sent out a call to hospital operating rooms for the adenoid tissue removed from children or adults having their tonsils and adenoids out. Before trying any suspected nose and throat disease viruses on the adenoids, the scientists first started cultures of the adenoids by themselves. To their surprise, they found that from these tissues, they got something that may be a virus, since it can pass through a filter like a virus. It can also be transmitted to other cultured tissues.

However, so far the scientists have not spun it down in a centrifuge or taken electron microscope pictures of it. So they are not entirely sure that it is a virus.

It does not cause disease in any of the laboratory animals tested so far.

Whether it exists only in children's adenoids or is also found in those of grown-ups is another of the questions still to be answered. No attempt had been made at the start of the work to separate adenoids from children and adults.

The big question: Does this "agent" or virus cause disease in humans? This is also still unanswered. Presumably it was not causing disease at the time the adenoids were removed, since doctors do not ordinarily remove adenoids from a patient with any sign of a cold or other disease.

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Questions

ASTRONOMY—What are two advantages of a Baker reflector-corrector telescope? p. 7.

How has the designer of most planetaria in the U. S. been honored? p. 9.

□□□

DERMATOLOGY—How many days in an average man's life are spent on shaving and haircuts? p. 8.

□□□

MEDICINE—How has a 25-year-old cancer theory been overthrown? p. 5.

□□□

PALEONTOLOGY—What was eohippus? p. 6.

□□□

PSYCHOLOGY—What tests help to spot potential delinquents? p. 4.

□□□

SPELEOLOGY—How can "spelunking" aid the study of man's history? p. 13.

□□□

ZOOLOGY—What percentages of predatory animals usually cause damage? p. 7.

□□□

Photographs: Cover, Johns Hopkins University; p. 3, Hastings Instrument Co., Inc.; p. 5, Fremont Davis; p. 7, Hans F. Kutschbach; p. 10, National Advisory Committee for Aeronautics; p. 16, Eastman Chemical Products, Inc.

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Science News Letter, January 2, 1954

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Science News Letter, January 2, 1954

HEADLIGHT SWITCH has built-in delayed action that permits the motorist to lock the car and walk to the house while the headlights remain on. One and a half minutes later (maximum adjustment) the lights snap off. Molded of a durable phenolic plastic, the device is easily mounted on the dashboard.

Science News Letter, January 2, 1954

SAFETY GLASSES, shown in the photograph, are quickly adjusted to fit each workman-wearer. The plastic temples slip

out to any desired length and will stay at the selected position. Many-purpose plastic lenses are designed to snap into the frames.

Science News Letter, January 2, 1954

EXPERIMENTAL KIT in electricity provides 190 experiments that children and science teachers can perform without danger. It demonstrates the basic principles of direct and alternating currents, and reveals in its 240-page manual how to build and operate six different types of motors. "This kit," the maker says, "is a real instruction tool."

Science News Letter, January 2, 1954

FREEZER THERMOMETER permits the housewife to read the temperature of her food freezer without opening it. Mounted on the wall near the freezer, the thermometer is connected to the food locker by a flexible tube.

Science News Letter, January 2, 1954

MOVIE OUTFIT permits continuous showing of 16mm film on a 13-by-18 inch "shadow-box" screen that can display the picture in an undarkened room. Projecting the picture from the rear of the screen, the outfit accommodates 1,600 feet (44 minutes) of film and will repeat the performance for 200 hours with no rewinding. A special humidifier puts moisture back into the film to extend its life.

Science News Letter, January 2, 1954

INSULATED TRUCK DOORS are lightweight and will not freeze closed, the maker reports. Fabricated of glass fiber and a plastic resin, the doors are molded in a single pan-like section filled with insulation and covered with aluminum.

Science News Letter, January 2, 1954

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Do You Know?

Although there is no current powered-aircraft production in Germany, gliding has been sanctioned and about 1,600 *gliders* now waft through German skies.

The Air Force's latest fighter-bomber, the F-84F Thunderstreak, "breathes" as much *air* in a minute as an adult does in four months.

One female *moth* and her family can destroy in a single year as much wool as it would take a dozen sheep to produce.

A manufacturer of electric *refrigerators* now includes a warning note in the instruction book that goes with its new models; the note reminds the buyer to make his discarded refrigerator safe so that children cannot suffocate inside it.

Members of the expedition that recently conquered *Mount Everest* each wore a climber's suit of an assigned color to provide easy identification at long distances.